0304-440-02: Numerical Methods — Dr. Kempski

Spring Quarter 2012-2013 (2123), MTWR 2-2:50 PM, Room *Engineering Hall* 17-1535 UOS

Instructor: *Dr. Mark Kempski*; Office: *Gleason Hall* 09-2091; Phone: 475-2473; Email: mhkeme@rit.edu
Office Hours: Nominally MTWRF noon-1pm 09-2120 plus TBD. Teaching Assistant: Ms. Kristin Roberts.

Catalog Description: This course entails the study of numerical methods as utilized to model and solve engineering problems on a computing device. Students learn to implement, analyze and interpret numerical solutions to a variety of mathematical problems commonly encountered in engineering applications. Topics include roots of algebraic and transcendental equations, linear systems, curve fitting, numerical differentiation and integration, and ordinary differential equations. Applications are taken from student's background in engineering, science and mathematics courses. *New for 2123*: Excel, Matlab, and LabVIEW programming environments will be utilized for concept & algorithm development; DAQ concepts and algorithms used during earlier courses will be revisited and embellished.

Textbook(s): Required: Chapra & Canale, Numerical Methods for Engineers, McGraw Hill, 6th Edition, 2010.
Supplemental: Musto, Howard & Williams, Engineering Computations: An Introduction using Matlab and Excel, McGraw-Hill, 2009. (text from 0304-342 Prob. Solving with Comp.)

Previous Coursework: Application examples will draw on your previous coursework and knowledge in: MIC, Problem Solving with Computers, Dynamics, Physics, Mechanics of Materials, Differential Equations, Matricies & BVP, and Thermo/Fluids. Be prepared to dust-off and use math tools & computer techniques (Excel, Matlab, LabVIEW) that you have used before, as well as, learn new tools & techniques!

Course Policies: When you come to office-hours to seek help on homework, please bring the paper-work you have done so far in solving the HW problem, or a pen-drive with the work done so far on your computer assignment(s).

Course Schedule: I have included a ***tentative*** course schedule. **Note**: this schedule probably will change over the course of the quarter! Any changes to the class schedule and assigned homework will be noted *in-class & via email*.

Class Attendance: We will hit-the-ground-running in this course and we will not stop running until after the final exam! So please plan on attending every class session. Habitual absence from this class is a recipe for failure. I will generate hand-written notes in real-time using the Elmo, so if you do miss class, please see me regarding my notes for a photocopy. Computer worked examples and exercises conducted during class may be difficult to replicate so do not miss class..

Grading: Dr. Kempski does the grading for Numerical Methods. You will have homework (mainly computer assignments), a take-home midterm, and a final exam/project. Your solutions to the HW, Midterm, & Final will be drop-boxed to the *myCourse* site (with specific submission details to follow). Your final grade breakdown will be:

Item	% of final grade	Final Grade
		90 - 100, *A*
9 HW	40%	80 - 89, *B*
Midterm	30%	70 - 79, *C*
Final Exam/Project	30%	60 - 69, *D*
		< 59, *F*

Late Submissions: Assignments/Exams/Project are due to the drop-box prior to the date specified (UOS). If work is submitted after the deadline there will be a 20% penalty for each day late (UOS). It is therefore imperative that you hand in your work on time.

Computer Lab Access: Open lab hours will be held by Dr. Kempski or Ms. Kristin Roberts; times & locations TBD.

Safety & Self Preservation: All computer equipped instructional venues in the Mechanical Engineering Department are multi-user facilities. When using the lab equipment, **never** trust that the equipment is still the way you left it previously. ***Restarting of computers before logging-in, frequent saving of files, and redundant backups/media for your files should be standard practice!***

COURSE POLICY ON ACADEMIC HONESTY

KGCOE HONOR PRINCIPLES: *RIT Engineering faculty, staff and students are truthful and honorable, and do not tolerate lying, cheating, stealing, or plagiarism.*

All members of our community are expected to abide by these principles and to embrace the spirit they represent. We each have a responsibility to address any unethical behavior we observe; either through direct discussion with the offending party, or by discussion with an appropriate faculty or staff member. Allowing unethical behavior to continue unchallenged is not acceptable.

Rochester Institute of Technology does not condone any form of academic dishonesty. Academic Dishonesty falls into three basic areas: cheating, duplicate submission and plagiarism (refer to http://www.rit.edu/kgcoe/advising/handbook.pdf pages 19-20 for more information).

Throughout 0304-440, the following specific conditions exist in regards to academic honesty:

Course Element	Specific Conditions
HW/Computer Assignments	Student collaboration is encouraged. However, the final product that is turned in must be your own work. All coding assignments must be properly documented with regards to comments, revisions, and references used (web sites, books other than the course textbook, other/previous courseware, etc.), *and assistance obtained from individuals other than the course instructor/TA*. Identical/nearly identical code will result in a 0 on the assignment for all persons involved.
Exams	Individual exercise; collaboration of any kind is disallowed
Project	Student collaboration is encouraged. However, the final product that is turned in must be your own work. All coding assignments must be properly documented with regards to comments, revisions, and references used (web sites, books other than the course textbook, other/previous courseware, etc.), *and assistance obtained from individuals other than the course instructor/TA*. Identical/nearly identical code will result in a 0 on the assignment for all persons involved.

Any act of Academic Dishonesty will incur the following consequences. After notifying and presenting the student with evidence of such misconduct, the instructor has the full prerogative to assign a lower grade, including an "F" for the offense itself or for the entire course. If after careful review of the evidence, the instructor decides that the student's actions are indeed misconduct and warrant a penalty, the instructor will add a letter to the student's file in his or her home department (copy to the student, Department Head and the Dean) documenting the offense. Depending on the seriousness of the offense, the student may also be brought before the Academic Conduct Committee of the College in which the offense occurred, and may face academic suspension or dismissal from the Institute. The student has the right to appeal any disciplinary action as described in section D17.0 "Academic Conduct and Appeals Procedures" and D18.0 "RIT Student Conduct Process" of the Institute Policies and Procedures Manual.

Academic Needs: *If you would like to request accommodations such as special seating, testing modifications, or note taking services due to a disability, please contact the Disability Services Office. It is located in the Eastman Building, Room 2342; the Web site is www.rit.edu/dso. After you receive accommodation approval, it is imperative that you see me during office hours so that we can work out whatever arrangement is necessary.*

Spring Quarter 2012-2013 (2123) 0304-440 (Kempski) **Tentative Schedule** *Rev 03-March-2013*

Wk	Day	Topic(s)	Text Reading	Homework Problems	Due Dates
1	1 2 3 4	Overview, ballistic model Excel intro/review Matlab intro/review LabVIEW intro/review	Musto Ch 1, 2, 5 Musto Ch 3, 4, 5 MIC for/while loops	**HW1**: Extension of in-class exercises Plus …TBD	
2	1 2 3 4	Ordinary Differential / State Eqns. Matlab scripts LabVIEW mathscript Excel solver	Musto Ch 9 Chapra		**HW1**
3	1 2 3 4	Block diagram math Matlab/Simulink LabVIEW simulation ***more to come***			**HW2**